Beamline 13-BM / GSECARS-CAT

Scientific focus: Geosciences, environmental science, and soil science

Scientific programs: High-pressure diffraction in diamond-anvil cell, high-pressure diffraction in multi-anvil press, microspectroscopy and XRF microprobe, and microtomography

Optics & Optical Performance
- VG double-crystal monochromator
    - 28 m from source
    - Si(111) or Si(311) crystal
    - water cooling
    - +15 to +30 mm offset
- vertical focusing mirror
    - 45 m from source
    - Si substrate
    - Pt, Rh, Si coatings
    - internal water cooling
    - elliptically bent flat geometry
    - 0–5 mrad grazing angle
    - 6:1 to 3:1 demagnification
- small Kirkpatrick-Baez microfocusing mirrors

Experiment Stations
13-BM-A
- white beam first optics enclosure

13-BM-B
- white beam second optics enclosure

13-BM-C (future addition)
- monochromatic beam station
- diffraction
- tomography

13-BM-D
- white or monochromatic beam station
- multi-anvil press high-pressure diffraction
- tomography
- microprobe
- microspectroscopy
- microcrystal diffraction

Detectors
- Canberra 16-element Ge detectors (two)
- Bruker 2K and 1500 CCD detectors
- Canberra single-element Ge and Si(Li) detectors
- Princeton Instruments visible light CCD cameras (four)

Beamline Controls and Data Acquisition
- Windows NT workstations running EPICS with VME
- SPEC, IDL, Bruker SMART and GADDS
- Princeton Instruments WinView and WinSpec

Beamline Support Equipment/Facilities
- 250-ton multi-anvil press with DIA and T-cup tooling (13-BM-D)

- Laser Raman system in support laboratory

Bending Magnet Source Characteristics (nominal)

source	APS bending magnet
critical energy	19.51 keV
on-axis peak brilliance at 16.3 keV	2.9×10^{15} ph/sec/mrad^2/mm^2/0.1%bw
on-axis peak angular flux at 16.3 keV	9.6×10^{13} ph/sec/mrad^2/0.1%bw
on-axis peak horizontal angular flux at 5.6 keV	1.6×10^{13} ph/sec/mradh/0.1%bw
source size at critical energy Σ_x Σ_y	145 μm 36 μm
source divergence at critical energy $\Sigma_{x'}$ $\Sigma_{y'}$	6 mrad 47 μrad